SAFE DRINKING WATER ACT
ANNUAL COMPLIANCE REPORT
FOR CALENDAR YEAR 2002

MARYLAND DEPARTMENT
OF THE ENVIRONMENT
WATER SUPPLY PROGRAM

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EXECUTIVE SUMMARY

The Safe Drinking Water Act reauthorization of 1996 requires states to submit annual reports of their drinking water violations. This report constitutes the seventh annual compliance report for the State of Maryland. The report contains an overview of the State's public drinking water program, including a description of routine activities that the State conducts to ensure that public water systems provide safe water to their consumers. This report also provides information on water quality standards, and summarizes public water system violations that occurred during 2002. The report covers the period from January 1 through December 31, 2002.

The Maryland Department of the Environment's (MDE's) goal is to ensure that the water quality and quantity at all public water systems meets the needs of the public and that the drinking water is in compliance with federal and State regulations. This report describes the activities that are undertaken on a routine basis to ensure that public drinking water systems provide safe water to their consumers. Routine activities include regular on-site inspections of water systems to identify any sanitary defects in the systems and a permitting process that helps systems obtain the best possible source of water. In addition, MDE works with private contractors and local health departments to identify potential sources of contamination in close proximity to ground water and surface water supplies, so that the systems can protect their water sources before contamination occurs.

During 2002, MDE accomplished many goals beyond its routine regulatory activities. This included establishing a baseline for capacity development of community water systems and conducting source water assessments for public water systems throughout Maryland. MDE also continued funding for several ground water contaminant studies, including radium, arsenic, cryptosporidium, and viruses. Maryland experienced one of the driest periods on record in 2002. MDE responded to escalating drought conditions by coordinating with local governments and water suppliers, and continuing to promote water conservation efforts throughout the state. The Department also managed the direct oversight of transient non-community water systems in three Maryland counties, and conducted program evaluations at many of the local health departments that have delegated responsibilities for these systems. MDE also provided Statewide training on the new regulations that were adopted in 2002 and are scheduled for adoption in 2003.

Systems are required to sample for up to 83 different contaminants on a routine basis, depending on the population served and source type of the water system. When contaminants are found at levels exceeding the federally established "Maximum Contaminant Level" (MCL), it is considered a violation of federal and State standards. MCL violations are rare in Maryland for most types of chemical contaminants. During 2002, no systems were in violation for a synthetic organic contaminant. Two systems exceeded the MCL for a volatile organic contaminant. No inorganic contaminants were found above the MCL during 2002, except for nitrate and radionuclides. Total coliform MCL violations are more common, but occur primarily in smaller systems where treatment may not be present or properly maintained. Ninety-seven percent of Maryland's community and non-transient non-community systems were in compliance with MCL requirements in 2002.

Violations are also incurred for failure to monitor as required, for failure to use required treatment processes, or for failure to notify the public under certain circumstances. During 2002, there were 53 monitoring violations for inorganic contaminants, eight monitoring violations for volatile organic contaminants, and 206 monitoring violations for total coliform.

THE DRINKING WATER PROGRAM: AN OVERVIEW

The EPA established the Public Water System Supervision (PWSS) Program under the authority of the 1974 Safe Drinking Water Act (SDWA). Under the SDWA and its 1986 and 1996 Amendments, EPA sets national limits on contaminant levels in drinking water to ensure that the water is safe for human consumption. These limits are known as Maximum Contaminant Levels (MCLs). For some regulations, EPA establishes treatment techniques in lieu of an MCL to control unacceptable levels of contaminants in water. The Agency also regulates how often public water systems (PWSs) monitor their water for contaminants and report the monitoring results to the states or EPA. Generally, the larger the population served by a water system, the more frequent the monitoring and reporting (M/R) requirements. In addition, EPA requires PWSs that serve over 10,000 persons to monitor for unregulated contaminants to provide data for future regulatory development. Finally, EPA requires PWSs to notify the public when they have violated these regulations. Public notification must include a clear and understandable explanation of the nature of the violation, its potential adverse health effects, steps that the PWS is undertaking to correct the violation and the possibility of alternative water supplies during the violation.

The SDWA applies to the 50 states, the District of Columbia, Indian Lands, Puerto Rico, the Virgin Islands, American Samoa, Guam, the Commonwealth of the Northern Mariana Islands, and the Republic of Palau.

The SDWA allows states and territories to seek EPA approval to administer their own PWSS Programs. The authority to run a PWSS Program is called primacy. For a state to receive primacy, EPA must determine that the state meets certain requirements laid out in the SDWA and the regulations, including the adoption of drinking water regulations that are at least as stringent as the Federal regulations and a demonstration that they can enforce the program requirements. All of the states have primacy with the exception of Wyoming. The EPA Regional Offices report the information for Wyoming, as well as the District of Columbia and all Indian Lands but the Navaho Nation. EPA Regional offices also report Federal enforcement actions taken. Maryland received primacy for the PWSS program in 1977.

Each quarter, primacy states submit data to the Safe Drinking Water Information System (SDWIS/FED), an automated database maintained by EPA. The data submitted include, but are not limited to, PWS inventory information, the incidence of Maximum Contaminant Level, monitoring, and treatment technique violations, and information on enforcement activities related to these violations. Section 1414(c)(3) of the Safe Drinking Water Act requires states to provide EPA with an annual report of violations of the primary drinking water standards. This report provides an overview of violations in each of five categories: MCLs, treatment techniques, variances and exemptions, significant monitoring violations, and significant consumer notification violations.

MARYLAND'S WATER SUPPLY PROGRAM

The Water Supply Program (WSP) is a part of the Water Management Administration within the Maryland Department of the Environment. The mission of the Water Supply Program is to ensure that public drinking water systems provide safe and adequate water to all present and future users in Maryland, and that appropriate usage, planning and conservation policies are implemented for Maryland's water resources. This mission is accomplished through proper planning for water withdrawal, protection of water sources that are used for public water supplies, oversight and enforcement of routine water quality monitoring at public water systems, regular onsite inspections of water systems, and prompt response to water supply emergencies. In addition to ensuring that public drinking water systems meet federal and State requirements under the PWSS program, the WSP also oversees the development of Source Water Assessments for water supplies, and permits water appropriations for both public drinking water systems and commercial entities Statewide. Because all of these activities reside together in the WSP, Maryland has the unique opportunity to evaluate and regulate public drinking water systems from a broad perspective that includes an evaluation of the resource for both quantity and quality. The Water Supply Program's activities help to ensure safe drinking water for more than four million Marylanders.

The WSP is responsible for regulating public drinking water systems in Maryland. Public drinking water systems fall into three categories: community, non-transient non-community, and transient non-community. Community water systems (CWS) serve year-round residents, non-transient non-community water systems (NTNCWS) serve regular consumers, such as in a school or daycare setting, and transient non-community water systems (TNCWS) serve different consumers each day, such as in a campground or restaurant. During 2002, the number of public water systems remained consistent as compared with the previous year. Currently, Maryland has 500 community water systems, 572 non-transient non-community water systems, and 2,713 transient non-community water systems.

MDE directly regulates community water systems that include municipalities, town water supplies and mobile home parks, and non-transient non-community water systems that include businesses, schools and day care centers that have their own water supply system. In 2002, transient non-community water systems such as gas stations, campgrounds and restaurants were regulated and enforced by the local county environmental health departments through agreements with MDE, with the exception of systems in Montgomery, Prince George's and Wicomico Counties, which were regulated and enforced by the Water Supply Program. Table 1 presents a summary of Maryland's statistics on public water systems and the populations served by each type of system.

Table 1. Drinking Water Statistics	
Population of Maryland (2002)	5,375,156
Individuals served by community water systems	4,499,130
Percent of population served by public water systems	84%
Percent of population served by individual wells	16%
Number of Public Water Systems	3,785
Number of Community Systems	500
Number of Non-transient Non-community Systems	572
Number of Transient Non-community Systems	2,713
Number of Systems using surface water	62
Number of Systems using only ground water	3,723

In the Water Supply Program, emphasis is placed on preventative measures instead of reactive enforcement actions in order to avert serious public health incidents. The vast majority of drinking water violations are corrected immediately, or following the issuance of public notices of violation. Preventive measures may include activities such as wellhead protection, surface water protection, and sanitary surveys. Wellhead and surface water protection programs can be used to identify sources of potential contamination, or assist in preventing contamination of the water supply.

Program Activities

Routine oversight of public drinking water systems involves a wide range of activities. These activities focus on helping systems to obtain and protect the best available source of water, ensuring that systems comply with State and federal water quality monitoring requirements, and making certain that systems maintain treatment processes sufficient enough to address any water quality concerns. As EPA develops new guidelines, or other drinking water issues arise, the Water Supply Program must respond by developing corresponding programs or adopting regulations. Table 2 presents a summary of the major regulatory activities conducted by the Water Supply Program in 2002.

Table 2. Water Supply Program's Major Activities for the Year 2002	
Sanitary Surveys Conducted of CWS and NTNCWS	811
Sanitary Surveys Conducted of TNC Systems (by local govt and MDE)	187
Comprehensive Performance Evaluations Conducted	7
Technical Reviews of Water Construction Projects	32
Water Appropriation Permits Issued (New and Renewal)	1,621
Individuals Certified to Sample Drinking Water	894
New Wells Sited	70
Water Quality Reports Reviewed	41,194
Source Water Assessments Completed	169

Appropriation Permits Any person who wishes to appropriate water for agricultural (greater than 10,000 gallons per day), municipal, commercial, industrial or other non-domestic uses must obtain a Water Appropriation Permit from the WSP. Issuance of the permit involves evaluating the potential needs of the user and the probable impact of the withdrawal on neighboring users and the water source, in order to maximize beneficial use of the waters of the State. The evaluation may involve conducting pump tests to measure the adequacy of an aquifer, or measuring stream flow to determine the adequacy of a surface water source.

Arsenic in Ground Water in the Major Aquifers of the Maryland Coastal Plain In accordance with its funding agreement with MDE, the MGS continued its investigation of arsenic in ground water in the major aquifers of the Coastal Plain. Two hundred and fifty samples were collected under Phase I of the study. About 25 percent of samples from the Aquia aquifer and 10 percent of samples from the Piney Point aquifer exceeded EPA's newly established drinking water standard of 10 micrograms per liter (µg/L). Most of the exceedances were from Queen Anne's, Talbot, Dorchester, and St. Mary's Counties. Arsenic was detected only sporadically in wells from other aquifers. Following the initial phase of the study, about 60 wells were resampled and analyzed for major ions, nutrients, and arsenic species. Most arsenic was present as arsenite (As III - the reduced form), which tends to be more mobile in ground water than arsenate (As V - the oxidized form). Additional samples were collected from the Aquia aquifer in the Kent Island area to gather information on local variability in arsenic concentrations (both vertically and laterally). Data analysis is continuing.

Capacity Development Regulations were finalized in 1999 that require all new community and non-transient non-community water systems to have sufficient technical, managerial, and financial capacity to provide safe drinking water to their consumers prior to being issued a construction permit. These capacity development regulations are currently being enforced by the WSP.

The WSP holds quarterly meetings with Maryland training providers to coordinate training and ensure that water system training needs are being met. During sanitary surveys, small water systems are provided technical assistance in emergency response and vulnerability assessments.

The WSP has collected capacity development information from 90% of its community water systems through a self-assessment survey and a baseline was determined in 2002. This baseline will be used to measure improvements in water system capacity in the future. The WSP also submitted a report entitled Safe Drinking Water Act Capacity Development Report to the Governor in September 2002.

Compliance Activities The more than 1,000 community and non-transient non-community water systems must test for over 80 regulated contaminants on schedules which vary based on source type and population. Data is received throughout the year and reviewed for compliance with the regulations. WSP staff received and reviewed more than 41,000 water quality reports in 2002. The WSP issues notices of violations (NOVs) for maximum contaminant level and treatment technique violations as they occur. NOVs for monitoring violations are issued quarterly. The WSP maintains an inventory of more than 3,700 public water systems.

Comprehensive Performance Evaluations (CPEs) The primary purpose of a CPE is to evaluate the performance of a surface water treatment plant to determine if the plant is optimized for removal of particles and parasitic organisms such as *Giardia* and *Cryptosporidium*. In addition, the CPE will assist in identifying areas of potential improvement in the operation, maintenance and administration of the plant in order to achieve optimized plant performance. Since 1990, when WSP began using this evaluation, the process has helped improve surface water plant performance and has strengthened drinking water treatment understanding among administrators and operators across the State. Because of these benefits, WSP plans to perform CPEs, with periodic re-evaluations, at all of Maryland's surface water plants. Seven CPEs were conducted in 2002, including evaluations of the Town of Lonaconing, Aberdeen Proving Ground's Van Bibber federal facility, City of Aberdeen's Chapel Hill plant, the Town of Port Deposit, the Town of Brunswick, the Fort Meade federal facility, and Frederick County's New Design plant.

Consumer Confidence Reports The Consumer Confidence Report Rule requires all community systems to report water quality data in an understandable format to their consumers, starting in 1999. Maryland adopted new regulations for the Consumer Confidence Rule in the fall of 2000, and received full primacy for this program in September 2001. The reports must be submitted annually to the WSP by July 1st for the previous calendar year, and certification of their delivery to each resident within the system must be submitted to the WSP by October 1st of each year. All community water systems submitted a Consumer Confidence Report (CCR) for 2002.

Cryptosporidium: Occurrence in the Potomac Basin A study of cryptosporidium levels in selected wastewater plants and water plant intakes was completed in 2002. In this study, which was conducted over the past several years, the cryptosporidium was recovered through a method developed by Dr. Thaddeus Gracyzk of Johns Hopkins University. The method utilizes a membrane filter dissolution process, along with a magnetic separation immuno-fluorescence

antibody procedure to enhance oocyst recovery. Cysts were tested for viability, infectivity and genotype.

Effluents were sampled from nine wastewater plants, each over four days with a twenty-four composite sample. Two samples were collected during a wet weather period and two were during a dry weather period. Twenty-one of the thirty-six samples were positive for cryptosporidium. Concentration ranges were between 3 and 590 oocysts per liter. The highest concentrations were measured during plant failures due to sewer overflow or washout. The oocysts were viable in nineteen samples and nine of these were found to be infectious. Seven of the nine infectious oocysts were of genotype II. The two wastewater plants with no detections of cryptosporidium both utilized contact growth treatment trains.

The source waters for nine water plants were also sampled for cryptosporidium. Four base flow samples and four storm events were sampled. Three samples were collected during each storm event. One was collected during the rising limb of the storm, one at peak storm turbidity and one during the falling limb. During base flow, seven of nine plant sites were positive for cryptosporidium. The highest concentration was 20 oocysts per liter. Cryptosporidium was detected in 61% of the base flow samples. During storm events, the highest detected concentration was 48 oocysts per liter and the highest median concentration (17 oocysts per liter) was found during peak turbidity periods. Samples were viable and infectious and typically of genotype II.

The average concentration of oocysts measured in wastewater effluent is about one order of magnitude higher than that found in water plant influent samples during the peak portion of storm events. Given that the percentage of wastewater flow at water plant intakes on the Potomac is 1% or less during storm events, the loadings measured in wastewater effluents are estimated to contribute not more than 10% of the load to the water plants. Non point sources of cryptosporidium appear to be the dominant contribution to the fairly significant levels of cryptosporidium measured in the raw water sources.

Drought Management Since January 2001, MDE has been evaluating hydrologic conditions using a plan developed by the Statewide Water Conservation Advisory Committee. Conditions are evaluated on a regional basis, and drought status is assessed monthly during normal conditions, and more frequently during times of water shortage. A precipitation deficit began in late summer 2001, and continued throughout calendar year 2002. During this period, MDE closely monitored this situation and its effect on water systems.

Several water systems in the Piedmont region began experiencing water shortages during early 2002, and some implemented mandatory water use restrictions for their consumers at that time. A drought emergency was declared for the central region of the State in April 2002, and for the eastern region and Baltimore City in August 2002. Mandatory water use restrictions remained in effect for the eastern region until November 2002, for the central region until March 2003, and for Baltimore City until April 2003. Substantial precipitation during the fall and winter of 2002-2003 has returned hydrologic conditions across the State to normal or above-normal conditions.

During the period of drought emergency, MDE coordinated with local governments through a network of local drought coordinators, and maintained continual contact with water suppliers to ensure that detrimental impacts of the drought emergency were minimized. Several water systems experienced water supply shortages, and some are currently evaluating actions to ensure that their systems are better prepared to meet the challenges of potential drought conditions in the future.

Emergency Response WSP staff are available to respond to water supply emergencies twenty-four hours a day and may offer technical advice, special sampling, or onsite assistance. Frequently, emergency response involves evaluating the safety of the water supply and determining whether a boil water advisory is required to protect public health. The WSP continues to provide ongoing technical assistance to help water systems minimize their risks of terrorist attacks.

Enforcement Strategy The strategy that has been adopted for managing enforcement is progressive enforcement. This technique has been effective in resolving violations, and reserving formal civil and criminal actions for the most serious cases. Mechanisms for obtaining compliance from a water system include:

- Voluntary compliance and correction by the system;
- Telephone calls: an effective method for obtaining complete details about the violation, which enables the State to answer any questions about system responsibilities. Many small water systems (serving less than 100 persons) are managed by volunteers who appreciate the extra assistance;
- Site visits: a system may require hands-on technical assistance by trained staff to address problems not previously encountered;
- Notice of violation: a formal action which contains information on the violation, public notification requirements, and potential enforcement actions;
- Consent agreement: a legal document prepared jointly between the water company and the State, with jointly negotiated deadlines;
- Order: a legal document which orders a water system to complete specific actions before deadlines established by the State;
- Civil and criminal judicial actions taken through the local courts;
- Administrative penalties issued by MDE;
- Financial assistance for a water system which may consist of federal Drinking Water State Revolving Loan Funds, or State Drinking Water Grant Assistance.

When there is a risk to the public's health due to failure of the treatment plant or the loss of water, progressive enforcement is not appropriate. In these types of cases, the State, in cooperation with the local health department, may issue an immediate notice to the system users through the local radio/TV stations, or by door-to-door handouts. Boil water advisories are managed in this manner. If corrective actions are expected to take days, alternative water sources may be recommended in the notices, or a safe supply of water may be hauled to the water system. MDE works to ensure that all public water is safe for the consumer, and to assist water systems in achieving compliance with the federal and State requirements.

Operator Certification Regulations Legislation for establishing a program to certify operators at water and wastewater facilities in Maryland was first passed in 1957. The most recent revision to the Maryland Annotated Code was in 1999 when the Board and the associated regulations were reestablished until July 1, 2011. The Code of Maryland Regulations for the Operator Certification Program was revised in January 2001, and approved by EPA on July 13, 2001. The regulations require community and non-transient non-community water systems to have State-certified operators. MDE has made no statutory or regulatory changes to the Operator Certification Program since January 2001. In February 2003, the grandparenting period for small water system operators ended.

During 2002, compliance with the operator certification regulations increased to 73%, as compared with 59% for the previous year. Of the 500 community water systems in the state, 438 have certified operators.

Radium in Coastal Plain Ground Water As a continuation of studies of radium occurrence in ground water, MDE funded a project conducted by the Maryland Geological Survey (MGS) to examine the aquifer materials as related to the radium measured in the ground water in aquifers in Anne Arundel County. A report describing a study of the geochemistry of aquifer materials from two core holes in northeastern Anne Arundel County was prepared by MGS for distribution in June 2003. The study was undertaken because ground water samples from shallow wells in the Magothy and Patapsco Formations often contain measurable concentrations of radium (even though concentrations of radon, a decay product of radium, tend to be low), whereas samples from shallow wells in the Aquia Formation generally have low radium concentrations but, in some cases, relatively high radon concentrations. Geochemical data from the core holes suggest that radium derived from mineral sources (e.g., zircon) present in the aquifers tends to remain in solution in ground water in the Magothy and Patapsco formations, but is removed from solution by ion exchange provided by other minerals coating the grains of the Aquia Formation. Radium trapped in grain coatings or held at exchange sites in the Aquia Formation is the likely source of the relatively higher radon concentrations in ground water sampled from the Aquia Formation. MGS Open-File Report No. 2003-02-15 contains the findings of this study.

This MGS report complements the previously completed aspects of the study of radium occurrence and distribution in the ground water in Anne Arundel County. A fully integrated three dimensional digital model of the geology and radium concentration throughout northern Anne Arundel County is routinely used to determine appropriate well depths for all new domestic and public supply wells in northern Anne Arundel County.

Regulations Maryland finalized drinking water regulations for the following federal rules: Interim Enhanced Surface Water Treatment Rule, Disinfection Byproduct Rule, Public Notification Rule, and Lead and Copper Rule Minor Revisions. The primacy revision package was submitted to EPA in April 2002.

Sanitary Survey Inspections A sanitary survey is an onsite inspection of a water system, including the source, treatment, storage, and distribution systems, as well as a review of the operations and maintenance of the system. These inspections are conducted for the purpose of determining the adequacy and reliability of the water system to provide safe drinking water to its

customers. The sanitary survey can be used to follow up known or suspected problems or on a routine basis to assess the water system's viability and prevent future problems from occurring. Inspectors may require system upgrades if sanitary deficiencies are identified. The WSP strives to inspect community and non-transient non-community water systems once each year. A total of 811 sanitary surveys were completed for community and non-transient non-community water systems in 2002.

Security The Water Supply Program continues to provide security related assistance to water systems during sanitary surveys. All water systems have been requested to prepare vulnerability assessments and emergency response plans. In addition, security updates such as change of alert status or drinking water warning are provided to the water systems quickly by email. The Water Supply Program is preparing to contract with a consulting firm to develop drinking water emergency standard procedures and response plans and to conduct training exercises. In addition, training exercises will be conducted and evaluated.

Small System Technical Assistance MDE continued funding for the fifth year of a circuit rider for the Maryland Rural Water Association (MRWA) to train operators of small water systems. MDE refers systems in need of assistance to the MRWA, and the MRWA's circuit rider provides hands on training to system operators for chemical feed systems, leak detection, corrosion control, and consumer confidence reporting.

Source Water Assessments The Safe Drinking Water Act reauthorization of 1996 requires each state to develop and submit to EPA a plan for conducting source water assessments for all public water supplies. Maryland's Source Water Assessment Plan was approved by EPA in November 1999. Maryland is conducting studies to define areas of contribution for each public water supply, identify potential sources of contamination within those areas, and assess the vulnerability of the supply to those sources of contamination.

By the end of 2002, source water assessments had been completed for 150 community water systems and 474 non-community water systems. Progress continued to be made on assessment projects involving the Patuxent and Liberty Reservoirs. Assessments were completed for Frederick City, the City of Salisbury, City of Annapolis, the City of Frostburg and City of Cumberland. A multi-state assessment for the seven Maryland utilities withdrawing from the Potomac River was completed in 2002. Contracts were signed in 2002 to initiate over 620 assessments. Assessments are scheduled to be completed for 97% of community water systems by the end of 2003, and for 100% of public water systems by the end of 2004.

Transient Non-community Water System Oversight The Water Supply Program continued to offer funding to each county environmental health program to accept delegation of responsibilities for transient non-community water systems in their jurisdictions. In 2002, twenty of the twenty-three counties in Maryland agreed to the delegation. The county programs agreed to conduct routine inspections and to ensure that the systems are monitored in accordance with State and federal requirements. The Water Supply Program continued to evaluate each county's transient program this year. The audits include a review of the county's files to determine whether they are following State and federal regulations, and a written summary of the findings. Eight program evaluations were conducted at various delegated counties in 2002. The

Water Supply Program directly monitors and inspects approximately 121 transient non-community water systems in the three counties that have declined delegated authority, Montgomery, Prince George's and Wicomico Counties.

Virus Study in Maryland Ground Water MDE completed the second of two studies with the U.S. Geological Survey (USGS) in 2002, concerning the occurrence and distribution of viral contamination in selected public supply wells. Both studies selected public supply wells using less than 10,000 gallons per day.

One study ranked the potential vulnerability of over 270 wells in Worcester and Wicomico counties to viral contamination, based on depth, geology and surrounding land use. Twenty-seven wells, which were ranked highest for potential for viral contamination and where permission was secured from the property owner, were sampled. Each site was sampled for basic water quality parameters (nutrients, major cations and anions, pH, temperature and conductance), RNA and DNA viral fragments, bacteria, culturable viruses and coliphages. Three of the 27 sites were positive for viral contamination. The samples for one of the three sites were collected from a compromised location (frost-free hydrant), another site was discovered to have a damaged well casing, and the positive results at the third site were not explainable. Total coliform and enterococci were each present in two of the three sites positive for viruses. Enterococci were not positive at any other sites. Four sites were positive for total coliform including the two positive virus wells. No sites were positive for E. coli. The data suggests that for properly constructed wells in the coastal plain, the likelihood for viral contamination is minimal. No single indicator of viral occurrence could be strongly recommended based on this study, due to the small number of viral positive samples.

The second study randomly selected 91 wells from all public systems pumping less than 10,000 gallons per day in Baltimore and Harford counties. The wells were sampled for the same suite of indicators, viruses and water chemistry parameters as identified above. None of the samples were positive for culturable viruses, and only one of the 91 samples detected viral DNA. The one positive viral sample was also positive for E. coli, total coliform, male specific coliphage and bacteroides fragilis. No other samples were positive for E. coli. Nineteen of the 91 samples were positive for total coliform. Seven samples were positive for enterococci, four of which were also positive for total coliform.

The results from both studies suggest that enterococci is a more sensitive indicator than E. coli but paradoxically enterococci was not present in the one Piedmont sample positive for virus or E. coli. Multiple samples are needed from each site in order to properly characterize microbiological water quality and insufficient data is available to convincingly establish if any particular indicator is a good predictor of viral occurrence. In general, microbiological water quality was good from these Piedmont sources although nine wells had total coliform concentrations exceeding 20 colonies/100 ml. Positive total coliform in samples collected from raw water taps is not necessarily indicative of actual ground water contamination, as insects can contaminate sample sites, pitless adaptors can develop leaks over time, well casings can corrode or buried lines can develop leaks allowing entry of very shallow water. These may not be significant routes for viral (fecal) contamination, but the presence of total coliform is a good indicator of the sanitary integrity of the water well system and should be addressed. The results

suggest that multiple indicators are needed to evaluate the risk of viral contamination and that the risk is fairly low to begin with from wells in the hydrologic settings evaluated.

Water Conservation Since 2001, MDE has been implementing a Statewide water conservation plan. The plan addresses water conservation in three primary areas: state facilities, water utilities, and public outreach and education.

In an effort to lead Maryland citizens by example, all facilities owned or leased by the State are expected to conduct annual audits of their water use and to develop and implement plans to reduce their water consumption by 10% by the year 2010. MDE worked with state agencies to establish baseline data for calendar year 2001, and is currently gathering 2002 data to assess progress toward meeting the established goal.

MDE asked the 30 large public water systems in Maryland to conduct annual water audits, and to develop water conservation plans where appropriate. As water appropriation permits for these systems are renewed or expanded, they are being modified to require these utilities to conduct annual audits of their water use. During the 2002 session, legislators passed the Maryland Water Conservation Act, which requires large water systems to include a description of water conservation practices when applying for new or expanded water appropriation permits. The bill also requires MDE to produce guidelines on water conservation best management practices for water utilities. This document is currently being drafted and will be available by October 2003.

Throughout this year, MDE worked to improve citizen awareness about the importance of conserving water. MDE has developed a comprehensive water conservation website, promoted water conservation through radio advertising, and presented water conservation exhibits at media and public events throughout the State. MDE is working closely with the Washington Council of Governments to develop and implement a new water conservation awareness initiative using the "Water Use It Wisely" campaign materials.

Watershed Management Several of the largest water systems in Maryland, including the City of Baltimore, City of Cumberland, and the Washington Suburban Sanitary Commission, rely on surface water sources. All of these systems currently have formalized watershed management programs in place. The purpose of watershed management programs is to ensure the high quality of water in streams and reservoirs used for drinking water. This is accomplished in a variety of ways, including the formation of watershed technical groups, the promotion of agricultural and urban best management practices (BMPs), the purchase of conservation easements and buffers along waterways, implementation of low-development zoning, and public education. The Water Supply Program is currently completing source water assessments; these assessments include recommendations for the establishment of new watershed management plans for Maryland communities that rely on surface water sources. Efforts to initiate a protection program has begun for the City of Frederick, Linganore Creek water supply source. The University of Maryland Environmental Finance Center has been facilitating this effort. The Appalachian Environmental Laboratory, who conducted an assessment of the City of Frostburg's Piney Reservoir in working to develop a watershed protection program for Frostburg's watershed.

Well Siting One important step in protecting a ground water supply is to identify the best possible location for the well. WSP staff conduct joint site inspections with local Health Department personnel to assist systems in locating new wells at community and non-transient non-community water systems. In 2002, approximately 70 well sites were approved by the WSP. A large number of new wells were drilled and tested in 2002 due to reduced production in existing wells during the 2002 drought.

Wellhead Protection Maryland's Wellhead Protection (WHP) Program was approved by EPA in 1991. Delineations of areas of contribution have been completed for more than 130 ground water systems. To date, 36 systems are implementing protection measures for their ground water supplies. These systems serve approximately 130,308 residents in Maryland (see Table 3).

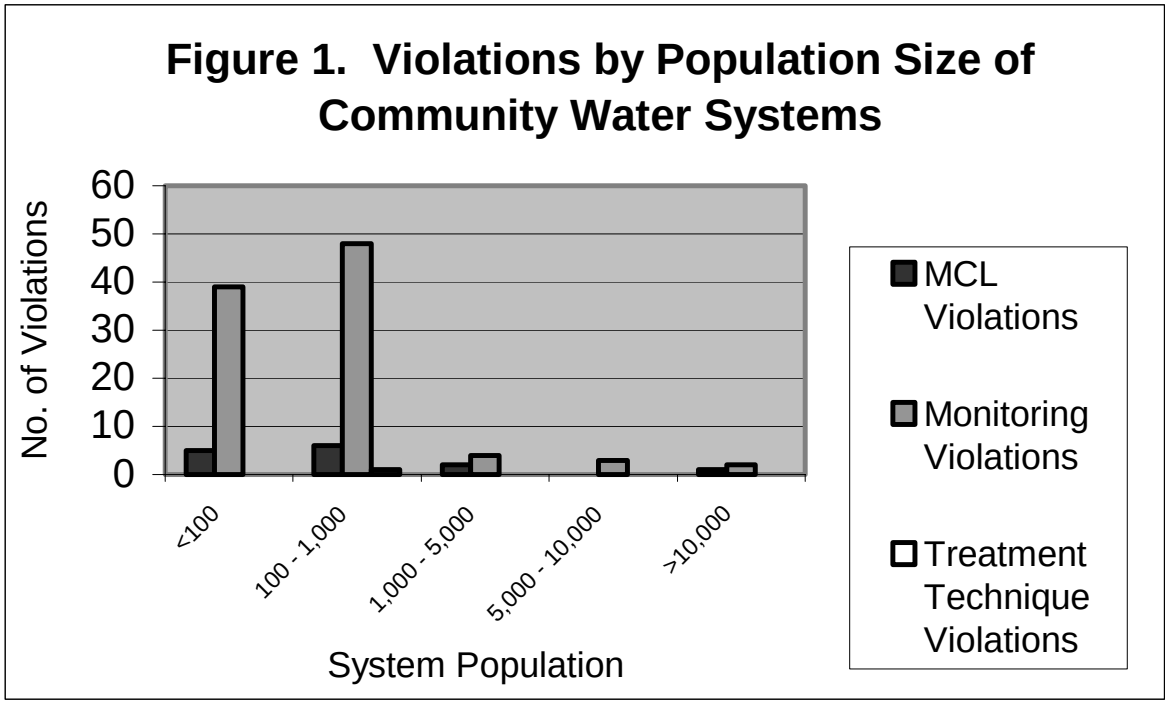
A resolution to adopt wellhead protection measures was adopted by the City of Aberdeen in 2002. Frederick County and several municipality water supplies met regularly throughout 2002 to develop an appropriate mechanism for enhancing the protection of their water supplies. Cecil County has delayed a formal introduction of its wellhead ordinance due to the need for educating new county officials on the program. Anne Arundel County has been evaluating different management approaches for wellhead protection. In 2002 funding was provided to the Town of Berlin and City of Westminster to develop locally based wellhead protection programs.

Table 3. Source Water Protection in Maryland For the Year 2002

System Type	No. of Systems	Population Benefited
Systems with Active WHP Programs	36	130,308
Systems with Active Watershed Management Programs	7	2,550,000

ANNUAL COMPLIANCE INFORMATION

This report includes violation data for calendar year 2002. MCL violations are reported for all types of public water systems. Monitoring violations are reported for all systems that are directly overseen by MDE, including all community water systems, all non-transient non-community water systems, and transient non-community water systems in Montgomery, Prince George's and Wicomico Counties. Figure 1 presents the various types of violations incurred by community water systems in 2002, based on the population size. Summaries of the various violations for all public water systems in 2002 are presented in Tables 4 through 9.



Typically, both MCL and monitoring violations occur more frequently in smaller systems, which have fewer resources and less technical expertise for operating the systems. MDE inspectors regularly visit systems with water quality problems to advise and assist system owners to meet their regulatory and water quality requirements.

Maximum Contaminant Levels

Under the Safe Drinking Water Act (SDWA), the EPA sets national limits on contaminant levels in drinking water to ensure that the water is safe for human consumption. These limits are known as Maximum Contaminant Levels (MCLs). Contaminants are categorized into several categories: Inorganic Contaminants, Organic Contaminants, Lead & Copper, and Bacteria.

In 2002, no systems exceeded the MCL for any inorganic contaminants except nitrate and radionuclides. Table 4 presents a summary of inorganic contaminant (IOC) violations. Fifteen systems exceeded the MCL of 10 mg/L for nitrate. The MCL for gross alpha radioactivity was exceeded at Point of Rocks in Frederick County, and the MCL for radium was exceeded at Point

of Rocks in Frederick County and Golden Kay Apartments in Cecil County. Table 5 presents a summary of volatile organic contaminant (VOC) violations. Only two systems exceeded the MCL for any organic contaminant in 2002. The MCL for tetrachloroethylene (TCE), a VOC, was exceeded at one system, New Market Shopping Center, located in Frederick County. The MCL for vinyl chloride, another VOC, was exceeded at Finksburg Plaza in Carroll County. Table 6 presents a summary of synthetic organic contaminant (SOC) violations. No systems exceeded an MCL for any SOC during 2002.

Transient water systems, such as churches, campgrounds, rest stops and restaurants, account for 72% of Maryland's public water systems. In 2002, twenty of Maryland's twenty-three counties had delegated authority for oversight of transient non-community systems in their jurisdictions, and received funding from MDE through the State Revolving Loan Fund set-asides. Transient systems in the delegated counties accounted for almost 96% of the total number of transient systems in 2002.

Counties who accepted delegation have overseen this program for about four years. The Water Supply Program has provided delegated counties with written and verbal guidance, and has offered several training opportunities to educate the county programs about the federal and State requirements for these systems. Beginning in 2001, the Water Supply Program initiated routine program evaluations of the delegated counties in order to provide additional direction. Eight program evaluations were completed in 2002, which involved visiting each county for a file review, and preparing a written evaluation of each program. The number of total coliform MCL violations for the transient systems in the delegated counties has begun to decrease due to the support the counties have been able to provide to the individual transient facilities. There were a total of 254 total coliform rule MCL violations at transient facilities in 2002.

Monitoring Compliance

A PWS is required to monitor and verify that the levels of contaminants present in the water do not exceed the MCL. If a PWS fails to have its water tested as required or fails to report test results correctly to the primacy state, a monitoring violation occurs.

Water systems are notified annually by MDE of their monitoring requirements. In addition, a reminder notice is sent to the systems about one month before the end of the year if reports are not received. If a system fails to report or complete the required testing, a violation letter is sent to the water system. If there is no response after about one month, a second notice of violation letter is sent by certified mail to the water system; this letter will typically contain a requirement for public notification, and potential fines. Phone calls and visits by the technical staff are also used to provide assistance to water systems.

Significant Monitoring Violations For this report, significant monitoring violations are generally defined as any major monitoring violation that occurred during the calendar year of the report. A major monitoring violation, with rare exceptions, occurs when no samples were taken or no results were reported during a compliance period. The tables in this report include monitoring violations for community water systems, non-transient non-community water systems, and the transient non-community water systems in Montgomery, Prince George's and Wicomico Counties, which were overseen directly by MDE. During 2002, there were 53

monitoring violations for IOCs, eight monitoring violations for VOCs, and 206 monitoring violations for total coliform (see Tables 4, 5 and 7). Twenty-nine systems failed to collect their initial tap sample for lead and copper, and 101 systems failed to collect follow-up sampling for lead and copper (see Table 8).

Table 4. Inorganic Contaminant Violations

Contaminant			MCL Violations			Monitoring Violations		
Code	**Name**	**MCL (mg/L)**	**# of Vios**	**# Vios RTC**	**# of Systems with Vios**	**# of Vios**	**# Vios RTC**	**# of Systems with Vios**
1074	Antimony*	0.006	0	0	0	14	8	14
1005	Arsenic	0.05	0	0	0	3	1	3
1094	Asbestos	7 mil. fibers/L	0	0	0	0	0	0
1010	Barium*	2	0	0	0	14	8	14
1075	Beryllium*	0.004	0	0	0	14	8	14
1015	Cadmium*	0.005	0	0	0	14	8	14
1020	Chromium*	0.1	0	0	0	14	8	14
1024	Cyanide	0.2	0	0	0	0	0	0
1025	Fluoride	4	0	0	0	4	2	4
1035	Mercury*	0.002	0	0	0	14	8	14
1040	Nitrate-N	10	18	12	15	24	16	24
1041	Nitrite-N	1	0	0	0	8	6	8
1045	Selenium*	0.05	0	0	0	14	8	14
1085	Thallium*	0.002	0	0	0	14	8	14
4000	Gross Alpha Radioactivity	15 pCi/L	1	0	1	0	0	0
4100	Gross Beta Radioactivity	4 mrem	0	0	0	0	0	0
4010	Combined Radium 226 +228	5 pCi/L	2	0	2	0	0	0
	Totals		21	12	18	53*	33*	53*

MCL = maximum contaminant level
RTC = returned to compliance
* Because the eight metals are sampled as a group, monitoring violations for these contaminants are reported to EPA as a group, rather than individually. Therefore, the fourteen monitoring violations incurred were not individual violations, and are counted as group violations in the Totals column.

Table 5. Violations for Volatile Organic Contaminants

Contaminant			MCL Violations			Monitoring Violations		
Code	**Name**	**MCL (mg/L)**	**# of Vios**	**# Vios RTC**	**# of Systems with Vios**	**# of Vios**	**# Vios RTC**	**# of Systems with Vios**
2977	1,1-Dichloroethylene	0.007	0	0	0	6	5	6
2981	1,1,1-Trichloroethane	0.2	0	0	0	6	5	6
2985	1,1,2-Trichloroethane	0.005	0	0	0	6	5	6
2980	1,2-Dichloroethane	0.005	0	0	0	6	5	6
2983	1,2-Dichloropropane	0.005	0	0	0	6	5	6
2378	1,2,4-Trichlorobenzene	0.07	0	0	0	6	5	6
2990	Benzene	0.005	0	0	0	6	5	6
2982	Carbon Tetrachloride	0.005	0	0	0	6	5	6
2380	cis-1,2-Dichloroethylene	0.07	0	0	0	6	5	6
2964	Dichloromethane (methylene chloride)	0.005	0	0	0	6	5	6
2992	Ethylbenzene	0.7	0	0	0	6	5	6
2989	Monochlorobenzene	0.1	0	0	0	6	5	6
2968	o-Dichlorobenzene	0.6	0	0	0	6	5	6
2969	p-Dichlorobenzene	0.075	0	0	0	6	5	6
2996	Styrene	0.1	0	0	0	6	5	6
2987	Tetrachloroethylene	0.005	1	1	1	6	5	6
2991	Toluene	1	0	0	0	6	5	6
2979	trans-1,2-Dichloroethylene	0.1	0	0	0	6	5	6
2984	Trichloroethylene	0.005	0	0	0	6	5	6
2950	Trihalomethanes (Total)	0.1	0	0	0	2	2	2
2976	Vinyl Chloride	0.002	1	0	1	6	5	6
2955	Xylenes (Total)	10	0	0	0	6	5	6
	Totals		2	1	2	8*	7*	8*

MCL = maximum contaminant level
RTC = returned to compliance
* Because volatile organic contaminants are sampled as a group, monitoring violations for these contaminants are reported to EPA as a group, rather than individually. Therefore, the six monitoring violations incurred were not individual violations, and are counted as group violations in the Totals column.

Table 6. Violations for Synthetic Organic Contaminants								
Contaminant			MCL Violations			Monitoring Violations		
Code	Name	MCL (mg/L)	# Vios	# Vios RTC	# of Systems with Vios	# Vios	# Vios RTC	# of Systems with Vios
2063	2,3,7,8-TCDD(dioxin)	3x10-8	0	0	0	0	0	0
2105	2,4-D (Formula 40, Weedar 64)	0.07	0	0	0	0	0	0
2110	2,4,5-TP (Silvex)	0.05	0	0	0	0	0	0
2051	Alachlor (Lasso)	0.002	0	0	0	0	0	0
2050	Atrazine (Atranax, Crisazina)	0.003	0	0	0	0	0	0
2306	Benzo(a)pyrene	0.0002	0	0	0	0	0	0
2046	Carbofuran (Furdan, 4F)	0.04	0	0	0	0	0	0
2959	Chlordane	0.002	0	0	0	0	0	0
2031	Dalapon	0.2	0	0	0	0	0	0
2035	Di(2-ethylhexyl)adiphate	0.4	0	0	0	0	0	0
2039	Di(2-ethylhexyl)phthalate	0.006	0	0	0	0	0	0
2931	Dibromochloropropane (DBCP, Nemafume)	0.0002	0	0	0	0	0	0
2041	Dinoseb	0.007	0	0	0	0	0	0
2032	Diquat	0.02	0	0	0	0	0	0
2033	Endothall	0.1	0	0	0	0	0	0
2005	Endrin	0.002	0	0	0	0	0	0
2946	Ethylene Dibromide (EDB, Bromofume)	0.00005	0	0	0	0	0	0
2034	Glyphosate	0.7	0	0	0	0	0	0
2065	Heptachlor (H-34, Heptox)	0.0004	0	0	0	0	0	0
2067	Heptachlor Epoxide	0.0002	0	0	0	0	0	0
2274	Hexachlorobenzene	0.001	0	0	0	0	0	0
2042	Hexachlorocyclopentadiene	0.05	0	0	0	0	0	0
2010	Lindane	0.0002	0	0	0	0	0	0
2015	Methoxychlor (DMDT, Marlate)	0.04	0	0	0	0	0	0
2036	Oxamyl (Vydate)	0.2	0	0	0	0	0	0
2326	Pentachlorophenol	0.001	0	0	0	0	0	0
2040	Picloram	0.5	0	0	0	0	0	0
2384	Polychlorinated biphenyls (PCB, Aroclor)	0.0005	0	0	0	0	0	0
2037	Simazine	0.004	0	0	0	0	0	0
2020	Toxaphene	0.003	0	0	0	0	0	0
	Totals		0	0	0	0	0	0

Table 7. Total Coliform Rule Violations				
Violation Name	**MCL**	**# of Vios**	**# Vios RTC**	**# of Systems with Vios****
MCL, Acute (Fecal Coliform)	Absence	38	36	34
MCL, Monthly (Total Coliform)	Absence	285	244	258
Monitoring, Routine and Repeat Major *	N/A	206	194	117
Totals		529	474	409

MCL = maximum contaminant level
RTC = returned to compliance

* Monitoring violations in this report include all CWS, all NTNC, and TNC systems in Montgomery, Prince George's and Wicomico Counties.

** For a system that serves fewer than 33,000 people and collects less than 40 samples per month, two positive samples in one compliance period is a violation. For a system that serves more than 33,000 people, greater than 5% of the samples testing positive in one compliance period is a violation.

Treatment Technique Compliance

For some regulations, the EPA establishes treatment techniques (TTs) in lieu of an MCL to control unacceptable levels of certain contaminants. In 2002, there were two Surface Water Treatment Rule (SWTR) treatment technique violations and no Lead & Copper treatment technique violations, as outlined in Tables 8 & 9.

Lead and Copper Rule Community and non-transient non-community water systems are required to treat their water if it is found to be corrosive. Based on a system's population, samples are collected at homes or sample locations with the highest probability of elevated lead and copper concentrations. This is determined based on a survey of when homes were constructed and the plumbing fixtures installed. Lead solder was prohibited from use in water systems in the mid 1980s. A water system's results for the compliance period cannot exceed the action level in more than 10% of the samples. In 2002, 55 systems exceeded the action level for lead and/or copper. Although exceeding the action level is not a violation, follow-up is required. In 2002, 49 systems failed to conduct required public education activities (see Table 8).

Table 8. Lead and Copper Violations			
Violation Name	**# of Vios**	**# Vios RTC**	**# of Systems with Vios**
Initial Tap Sampling for Lead and Copper	32	21	29
Follow-up or Routine Tap Sampling	102	26	101
OCCT Installation/Demo & SOWT Installation	0	0	0
Public Education	49	34	49
Totals	183	81	179

OCCT = Optimum Corrosion Control Treatment
SOWT = Source Water Treatment
RTC = returned to compliance
# of vios = Number of violations that occurred in 2002 plus number of ongoing, unresolved violations

Surface Water Treatment Rule Water systems that use surface water as their drinking water source are required to provide filtration and disinfection. The treatment process is monitored throughout each day, and reported monthly to the State. Table 9 outlines the Surface Water Treatment Rule violations for 2002. Two systems exceeded the turbidity MCLs indicating that their treatment systems may not be functioning properly, and four systems failed to install required filtration systems to meet federal and State regulations.

Only one surface water system has not installed filtration; the water system is expected to connect to a larger water system in the next year. The remaining three water systems are ground water systems under the influence of surface water, and they are proceeding with treatment design and construction.

Table 9. Surface Water Treatment Rule Violations				
Type of System	**Violation Type**	**# of Vios**	**# Vios RTC**	**# of Systems with Vios**
Filtered Water Systems	Treatment Technique	2	0	2
Unfiltered Water Systems	Failure to Filter	4	1	4
Totals		6	1	6

RTC = returned to compliance

Variances and Exemptions

A primacy state can grant a PWS a variance from a primary drinking water regulation if the characteristics of the raw water sources reasonably available to the PWS do not allow the system to meet the MCL. To obtain a variance, the system must agree to install the best available technology, treatment techniques, or other means of limiting drinking water contamination that the Administrator finds are available (taking costs into account), and the state must find that the variance will not result in an unreasonable risk to public health. At the time the variance is granted, the State must prescribe a schedule the PWS will follow to come into eventual compliance with the MCL. Small systems may also be granted variances if they cannot afford (as determined by application of the Administrator's affordability criteria) to comply with certain MCLs (non-microbial, promulgated after January 1, 1986) by means of treatment, alternative source of water, restructuring or consolidation. Small systems will be allowed three years to install and operate EPA approved small system variance technology. The variance shall be reviewed not less than every five years to determine if the system remains eligible for the variance.

A primacy state can grant an exemption temporarily relieving a PWS of its obligation to comply with an MCL, treatment technique, or both if the system's noncompliance results from compelling factors (which may include economic factors) and the system was in operation on the effective date of the MCL or treatment technique requirement. A new PWS that was not in operation on the effective date of the MCL or treatment technique requirement by that date may be granted an exemption only if no reasonable alternative source of drinking water is available to the new system. Neither an old or a new PWS is eligible for an exemption if management or restructuring changes can reasonably be made that will result in compliance with the SDWA or improvement of water quality, or if the exemption will result in an unreasonable risk to public health. The State will require the PWS to comply with the MCL or treatment technique as expeditiously as practicable, but not later than three years after the otherwise applicable compliance date. Maryland did not provide variances or exemptions for any water system in 2002.

Consumer Confidence Report Compliance

Every Community Water System is required to deliver to its customers a brief annual water quality report. This report is required to include some educational material, and provides information on the source water, the levels of any detected contaminants, and compliance with drinking water regulations.

During 2001, Maryland received full primacy for the Consumer Confidence Rule (CCR). All community water systems submitted a Consumer Confidence Report (CCR) for 2002. Not all reports were submitted by the July 1st, 2002 deadline. Those systems have been notified of the violation through verbal and written communication, and have returned to compliance.

Disinfection Byproduct Rule Compliance

During 2002, the surface water systems that serve 10,000 or more persons began monitoring for haloacetic acids (HAA5), in coordination with the total trihalomethane (TTHM) samples which were previously collected. One water system exceeded the MCL for HAA5; they have returned to

compliance and are evaluating additional treatment options for the future. In addition, one water system was late in collecting the quarterly samples for one quarter.

Maryland has revised the monitoring schedules for water systems that are required to monitor in 2004. Lab capacity issues and training will be a priority in 2003.

DEFINITIONS

Filtered Systems Water systems that have installed filtration treatment [40 CFR 141, Subpart H].

Inorganic Contaminants Non-carbon-based compounds such as metals, nitrates, and asbestos. These contaminants are naturally occurring in some water, but can get into water through farming, chemical manufacturing, and other human activities. EPA has established MCLs for 15 inorganic contaminants [40 CFR 141.62].

Lead and Copper Rule This rule established national limits on lead and copper in drinking water [40 CFR 141.80-91]. Lead and copper corrosion pose various health risks when ingested at any level, and can enter drinking water from household pipes and plumbing fixtures. States report violations of the Lead and Copper Rule in the following four categories:

> *Initial lead and copper tap monitoring and reporting:* SDWIS Violation Code 51 indicates that a system did not meet initial lead and copper testing requirements, or failed to report the results of those tests to the State.
>
> *Follow-up or routine lead and copper tap monitoring and reporting:* SDWIS Violation Code 52 indicates that a system did not meet follow-up or routine lead and copper tap testing requirements, or failed to report the results.
>
> *Treatment installation:* SDWIS Violation Codes 58 AND 62 indicate a failure to install optimal corrosion control treatment system (58) or source water treatment system (62) which would reduce lead and copper levels in water at the tap.
>
> *Public education:* SDWIS Violation Code 65 shows that a system did not provide required public education about reducing or avoiding lead intake from water.

Maximum Contaminant Level (MCL) The highest amount of a contaminant that EPA allows in drinking water. MCLs ensure that drinking water does not pose either a short-term or long-term health risk. MCLs are defined in milligrams per liter (parts per million) unless otherwise specified.

Monitoring EPA specifies which water testing methods the water systems must use, and sets schedules for the frequency of testing. A water system that does not follow EPA's schedule or methodology is in violation [40 CFR 141].

States must report monitoring violations that are significant as determined by the EPA Administrator and in consultation with the States. For purposes of this report, significant monitoring violations are major violations and they occur when no samples are taken or no results are reported during a compliance period. A major monitoring violation for the surface water treatment rule occurs when at least 90% of the required samples are not taken or results are not reported during the compliance period.

Organic Contaminants Carbon-based compounds, such as industrial solvents and pesticides. These contaminants generally get into water through farm cropland or discharge from factories. EPA has set legal limits on 54 organic contaminants that are to be reported [40 CFR 141.61].

Public Water System A Public Water System (PWS) is defined as a system that provides water via piping or other constructed conveyances for human consumption to at least 15 service connections or serves an average of at least 25 people for at least 60 days each year. There are three types of PWSs. PWSs can be community (such as towns), non-transient non-community (such as schools or factories), or transient non-community systems (such as rest stops or parks). For this report when the acronym "PWS" is used, it means systems of all types unless specified in greater detail.

Radionuclides Radioactive particles that can occur naturally in water or result from human activity. EPA has set legal limits on four types of radionuclides: radium-226, radium-228, gross alpha, and beta particle/photon radioactivity [40 CFR 141]. Violations for these contaminants are to be reported using the following three categories:

> *Gross alpha:* SDWIS Contaminant Code 4000 for alpha radiation above MCL of 15 picoCuries/liter. Gross alpha includes radium-226 but excludes radon and uranium.
>
> *Combined radium-226 and radium-228:* SDWIS Contaminant Code 4010 for combined radiation from these two isotopes above MCL of 5 pCi/L.
>
> *Gross beta*: SDWIS Contaminant Code 4100 for beta particle and photon radioactivity from man-made radionuclides above 4 millirem/year.
>
> *Uranium:* SDWIS Contaminant Code 4006 for total Uranium above MCL of 30 µg/L.

Reporting Interval The reporting interval for violations to be included in the WSP Annual Compliance Report, which is to be submitted to EPA by July 1, 2003, is from January 1, 2002 through December 31, 2002. Subsequent reports will be due by July 1st for the previous calendar year's violations.

SDWIS Code Specific numeric codes from the Safe Drinking Water Information System (SDWIS) have been assigned to each violation type included in this report. The violations to be reported include exceeding contaminant MCLs, failure to comply with treatment requirements, and failure to meet monitoring and reporting requirements. Four-digit SDWIS Contaminant Codes have also been included in the chart for specific MCL contaminants.

Surface Water Treatment Rule The Surface Water Treatment Rule establishes criteria under which water systems supplied by surface water sources, or ground water sources under the direct influence of surface water, must filter and disinfect their water [40 CFR 141, Subpart H]. Violations of the Surface Water Treatment Rule are to be reported for the following four categories:

> *Monitoring, routine/repeat (for filtered systems):* SDWIS Violation Code 36 indicates a system's failure to carry out required tests, or to report the results of those tests.

Treatment techniques: SDWIS Violation Code 41 shows a system's failure to properly treat its water. States report Code 41 for filtered and unfiltered systems to EPA.
Failure to filter (for unfiltered systems): SDWIS Violation Code 42 shows a system's failure to properly treat its water.

Monitoring, routine/repeat (for unfiltered systems): SDWIS Violation Code 31 indicates a system's failure to carry out required water tests, or to report the results of those tests.

Total Coliform Rule (TCR) The Total Coliform Rule establishes regulations for microbiological contaminants in drinking water. These contaminants can cause short-term health problems. If no samples are collected during the one month compliance period, a significant monitoring violation occurs. States are to report four categories of violations:

Acute MCL violation: SDWIS Violation Code 21 indicates that the system found fecal coliform or E. coli, potentially harmful bacteria, in its water, thereby violating the rule.

Non-acute MCL violation: SDWIS Violation Code 22 indicates that the system found total coliform in samples of its water at a frequency or at a level that violates the rule. For systems collecting fewer than 40 samples per month, more than one positive sample for total coliform is a violation. For systems collecting 40 or more samples per month, more than 5% of the samples positive for total coliform is a violation.

Major routine and follow-up monitoring: SDWIS Violation Codes 23 AND 25 show that a system did not perform any monitoring.

Sanitary Survey: SDWIS Violation Code 28 indicates a major monitoring violation if a system fails to collect 5 routine monthly samples if sanitary survey is not performed.

Treatment Techniques A water treatment process that EPA requires instead of an MCL for contaminants that laboratories cannot adequately measure. Failure to meet other operational and system requirements under the Surface Water Treatment and the Lead and Copper Rules have also been included in this category of violation for purposes of this report.

Unfiltered Systems Water systems that do not need to filter their water before disinfecting it because the source is very clean [40 CFR, Subpart H].

Violation A failure to meet any State or federal drinking water regulation.